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NOTICE OF ALLOWANCE AND FEE(S) DUE

24498 7590 12/30/2009

Robert D. Shedd, Patent Operations
THOMSON Licensing LLC
P.O. Box 5312
Princeton, NJ 08543-5312

EXAMINER	
BAIG, ADNAN	
ART UNIT	PAPER NUMBER
2461	

DATE MAILED: 12/30/2009

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/589,648	08/16/2006	Peter Georg Baum	PD040023	9988

TITLE OF INVENTION: METHOD AND APPARATUS FOR TRANSFORMING A DIGITAL AUDIO SIGNAL AND FOR INVERSELY TRANSFORMING A TRANSFORMED DIGITAL AUDIO SIGNAL

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	$1510	$300	$0	$1810	03/30/2010

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PTOL-85 (Rev. 08/07) Approved for use through 08/31/2010.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
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P.O. Box 1450
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INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

24498 7590 12/30/2009

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Princeton, NJ 08543-5312

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I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/589,648	08/16/2006	Peter Georg Baum	PD040023	9988

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nonprovisional	NO	$1510	$300	$0	$1810	03/30/2010

EXAMINER	ART UNIT	CLASS-SUBCLASS
BAIG, ADNAN	2461	370-210000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

❑ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

(1) the names of up to 3 registered patent attorneys or agents OR, alternatively, 1_____

(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2_____ 3_____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

4a. The following fee(s) are submitted:

❑ Issue Fee

❑ Publication Fee (No small entity discount permitted)

❑ Advance Order - # of Copies _____

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**

❑ A check is enclosed.

❑ Payment by credit card. Form PTO-2038 is attached.

❑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)

❑ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.

❑ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 628 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 628 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

Notice of Allowability	Application No.	Applicant(s)	
	10/589,648	BAUM, PETER GEORG	
	Examiner	Art Unit	
	ADNAN BAIG	2461	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *8/13/2009*.

2. ☒ The allowed claim(s) is/are *1-6*.

3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☒ All b) ☐ Some* c) ☐ None of the:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☒ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

/ADNAN BAIG/
Examiner, Art Unit 2461

DETAILED ACTION

Allowable Subject Matter

1. Claim 1-6 are allowed.

2. The rejections under 35 USC 112, second paragraph regarding Claims 1-6 have been withdrawn.

3. The rejections under 35 USC 101 regarding Claims 1, 2, 5, and 6 have been withdrawn.

4. The following is an examiners statement of reasons of allowance:

Regarding Claim 1, the prior art fails to teach the steps of Receiving by an audio signal processor a digital audio signal in the time domain: and transforming by the audio signal processor the digital audio signal from the time domain into a different domain, comprising: forming partitions of transform length N from said digital audio signal, which partitions overlap by N/2, wherein N is an integer multiple of '4', performing a multiplication of a transform matrix Mh, said transform matrix having a size of N/2 rows and N columns, with each one of said partitions such that succeeding transformed signal partitions are provided, wherein said transform matrix is constructed in the form:

Mh = [a Ir(a) b Ir(-1*b)],

wherein 'a' and 'b' are sub-matrices each having N/2 rows and N/4 columns and including '+1' and '-1' values only, and wherein Ir() means that columns or elements of a sub-matrix are reversed in order, and wherein 'a' and 'b' are chosen such that a matrix

MhFull = [a Ir(a) b Ir(-l*b)] has the rank N,

[b Ir(-l*b) a Ir(a)]

whereby said transform matrix multiplication outputs N/2 output values per N input values representing a subsampling by a factor of '2', thereby forming a transformed digital audio signal.

Regarding Claim 2 the prior art fails to teach the steps of inversely transforming a digital audio signal, which digital audio signal was constructed by the steps: forming partitions of transform length N from an original digital audio signal which partitions were overlapping by N/2, wherein N is an integer multiple of '4';

performing a multiplication of a transform matrix Mh, said transform matrix having a size of N/2 rows and N columns, with each one of said partitions such that succeeding transformed signal partitions were provided, wherein said transform matrix was constructed in the form Mh = [a Ir(a) b Ir(-1*b)], wherein 'a' and 'b' were sub-matrices each having N/2 rows and N/4 columns and including '+1' and '-1' values only, and wherein Ir() means that columns or elements of a sub-matrix were reversed in order, and wherein 'a' and 'b' were chosen such that a matrix

MhFull = [a Ir(a) b Ir(-I*b)] has the rank N,

[b Ir(-I*b) a Ir(a)]

whereby said transform matrix multiplication had output N/2 output values per N input values representing a subsampling by a factor of '2', thereby having formed a transformed digital audio signal, said method including the steps: receiving by an audio signal processor the digital audio signal; and transforming by the audio signal processor the digital audio signal into the time domain, comprising: performing a multiplication of an inverse transform matrix invMh, said inverse transform matrix having a size of N rows and N/2 columns, with each one of said transformed signal partitions such that succeeding inversely transformed signal partitions of length N are provided, wherein said inverse transform matrix invMH is constructed by taking the left half of the inverse of the matrix

[a Ir(a) b Ir(-I*b)]

[b Ir(-I*b) a Ir(a)]

wherein 'a' and 'b' are sub-matrices as defined above; assembling said inversely transformed signal partitions in an overlapping manner so as to form an inversely transformed digital audio signal, whereby said overlapping is of size N/2, and whereby the samples values of said inversely transformed signal partitions, or the samples values of said inversely transformed digital audio signal, or the values of said

transformed signal partitions are each scaled by multiplication with factor '1/N' or by a division by 'N' or by a corresponding binary shift operation.

Regarding Claim 3, the prior art fails to teach the steps transforming a digital audio signal from the time domain into a different domain, said apparatus including: means which form partitions of transform length N from said digital audio signal, which partitions overlap by N/2, wherein N is an integer multiple of '4'; means which perform a multiplication of a transform matrix Mh, said transform matrix having a size of N/2 rows and N columns, with each one of said partitions such that succeeding transformed signal partitions are provided, wherein said transform matrix is constructed in the form: Mh = [a Ir(a) b Ir(-l*b)]

wherein 'a' and 'b' are sub-matrices each having N/2 rows and N/4 columns and including '+1' and '-1' values only, and wherein Ir() means that columns or elements of a sub-matrix are reversed in order, and wherein 'a' and 'b' are chosen such that a matrix

MhFull = [a Ir(a) b Ir(-l*b)] has the rank N,
[b Ir(-l*b) a Ir(a)]

whereby said transform matrix multiplication means output N/2 output values per N input values representing a subsampling by a factor of '2', thereby forming a transformed digital audio signal.

Regarding Claim 4 the prior art fails to teach the steps of inversely transforming a digital audio signal into the time domain, which transformed digital audio signal was constructed by the steps: forming partitions of transform length N from an original digital audio signal which partitions were overlapping by N/2, wherein N is an integer multiple of '4';

performing a multiplication of a transform matrix Mh, said transform matrix having a size of N/2 rows and N columns, with each one of said partitions such that succeeding transformed signal partitions were provided, wherein said transform matrix was constructed in the form Mh = [a Ir(a) b Ir(-1*b)], wherein 'a' and 'b' were sub-matrices each having N/2 rows and N/4 columns and including '+1' and '-1' values only, and wherein Ir() means that columns or elements of a sub-matrix were reversed in order, and wherein 'a' and 'b' were chosen such that a matrix

MhFull = [a Ir(a) b Ir(-l*b)] has the rank N,
[b Ir(-l*b) a Ir(a)]

whereby said transform matrix multiplication had output N/2 output values per N input values representing a subsampling by a factor of '2', thereby having formed a transformed digital audio signal, said apparatus including the steps: means which

perform a multiplication of an inverse transform matrix invMh, said inverse transform matrix having a size of N rows and N/2 columns, with each one of said transformed signal partitions such that succeeding inversely transformed signal partitions of length N are provided, wherein said inverse transform matrix invMH is constructed by taking the left half of the inverse of the matrix

[a Ir(a) b Ir(-I*b)]

[b Ir(-I*b) a Ir(a)]

wherein 'a' and 'b' are sub-matrices as defined above; means which assemble said inversely transformed signal partitions in an overlapping manner so as to form an inversely transformed digital audio signal, whereby said overlapping is of size N/2, and whereby the samples values of said inversely transformed signal partitions, or the samples values of said inversely transformed digital audio signal, or the values of said transformed signal partitions are each scaled by multiplication with factor '1/N' or by a division by 'N' or by a corresponding binary shift operation.

5. In (USP 6,137,824) Liu discloses a method for estimating signal quality being used in a spread spectrum radio system where a transform matrix containing independent orthogonal submatrices are implemented, however the method does not teach forming partitions of transform length N from an audio signal, which partitions overlap N/2, wherein N is an integer multiple of 4 and constructing the submatrices to have N/2 rows and N/4 columns in order to develop a matrix of the rank N which outputs N/2 values per N input values representing a subsampling factor of '2'.

6. The dependant claims 5 and 6, being further limiting, definite and enabled by the specification, are also allowable.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled “Comments on Statement of Reasons for Allowance.”

Prior Art

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

9. (USP 6,137,824) Liu

10. H. Caglar ET AL. “Permutation based design of orthogonal block transforms and filter banks" MULTIDIMENSIONAL SYSTEMS AND SIGNAL PROCESSING, no 12, 2001, pages 63-79

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ADNAN BAIG whose telephone number is (571) 270-7511. The examiner can normally be reached on Mon-Fri 7:30m-5:00pm eastern Every other Fri off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Huy Vu can be reached on 571-272-3155. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/ADNAN BAIG/
Examiner, Art Unit 2461

/Huy D Vu/
Supervisory Patent Examiner, Art Unit 2461